

CLAIMS

1 (amended). A pipe, [of the type] comprising:

- a concrete cylinder possessing at least one annular end of determined longitudinal axis, defined by a longitudinal outside peripheral face and by a transverse front face;

- a female end ring coaxial with said end and secured thereto, the ring consisting in:

- firstly a longitudinal ferrule for securing to the cylinder, the ferrule being defined by a longitudinal inside peripheral face fitting snugly against said outside peripheral face in the immediate vicinity of said front face; and

- secondly a longitudinal skirt projecting longitudinally over said front face to engage coaxially on a male endpiece of another pipe,

wherein the ferrule is in a state of circumferential elastic tension providing sealing relative to said outside peripheral face by said inside peripheral face applying thereagainst transverse pressure which is circumferentially distributed in continuous manner.

2 (amended). A pipe according to claim 1, wherein said circumferential elastic tension is such that said inside peripheral face is fastened, at least in part, to said

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outside peripheral face by the mutual friction effect that results from said transverse pressure.

3 (amended). A pipe according to claim 2, ^{former including} wherein ⁹¹ it includes at least one band coaxially surrounding the ferrule ⁵ and placed in circumferential tension.

4 (amended). A pipe according to claim 1, wherein said inside peripheral face ²³ presents at least one continuous annular sealing portion in relief ²⁹ facing said outside peripheral face ¹² in a state of elastic and/or plastic transverse compression thereagainst, formed integrally with the ferrule ⁵.

5 (amended). A pipe according to claim 1, wherein said outside peripheral face ¹² and said inside peripheral face ²³ flare in the longitudinal direction going away from said front face ¹¹ and relative to the transition between the ferrule ⁵ and the skirt ⁶ ²².

6 (amended). A pipe according to claim 4 wherein said continuous annular portion in relief ²⁹ is in the form of a rib ²⁹ and there is only one of them.

7 (amended). A pipe according to claim 1, wherein said inside peripheral face ²³ is fastened to said outside peripheral face ¹² by annular adhesive ⁵² between them.

8 (amended). A pipe according to claim 1, ^{f.i.} wherein ⁵ it includes at least one continuous sealing ring of plastic

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material interposed between said inside peripheral face and
said outside peripheral face.¹²

9 (amended). A pipe according to claim 1, [wherein (it
f.i. includes)¹⁴ an annular sealing gasket of an elastically
compressible material interposed in elastic transverse²³
compression stress between said inside peripheral face and
said outside peripheral face,¹² at least in the immediate
vicinity of said front face.¹¹

10 (amended). A pipe according to claim 9, wherein
said outside peripheral face¹² presents a localized annular
setback¹⁷ at least in the immediate vicinity of said front
face¹¹ and in that said gasket is received over a fraction of¹⁸
its transverse dimension¹⁷ in said setback.

11 (amended). A pipe according to claim 9, wherein said
gasket is in the form of a film.¹⁸

12 (amended). A pipe according to claim 11, wherein
said film¹⁸ extends from said front face¹¹ over a longitudinal
dimension shorter than the respective longitudinal¹²
dimensions of said outside peripheral face and of inside
peripheral face.²³

13 (amended). A pipe according to claim 11, wherein
said inside peripheral face²³ is fastened to said film¹⁸ by
annular adhesive⁵³ between them.

14 (amended). A pipe according to claim 11, wherein
said film presents at least one continuous annular bulge
spaced apart longitudinally from said front face by a
distance which is shorter than the respective longitudinal
dimensions of said outside peripheral face and said inside
peripheral face causing an increase in said tension and in
said pressure that is localized longitudinally.

15 (amended). A pipe according to claim 14, wherein
said continuous annular bulge corresponds to a continuous
annular groove in said inside peripheral face.

16 (amended). A pipe according to claim 1, wherein the
inside of the ring presents longitudinal abutment means for
engaging said front face, the abutment means being located
at the transition between the ferrule and the skirt
projecting transversely relative to said inside peripheral
face and being placed facing said front face.

17 (amended). A pipe according to claim 16, wherein
the skirt also presents a longitudinal inside peripheral
face, and in that the abutment means also form a transverse
projection relative thereto to serve as a longitudinal
abutment for said male endpiece.

18 (amended). A pipe according to claim 17, wherein
the abutment means comprise a transverse annulus that is

circumferentially continuous, and that presents a longitudinal dimension that is uniform.

19 (amended). A pipe according to claim 16, wherein said ¹⁸film forms an annular rim extending transversely on said front face;

and in that the longitudinal abutment ³⁴means press longitudinally against said front face via said rim.

20 (amended). A pipe according to claim 1, wherein the inside of the skirt presents a shape suitable for receiving and holding at least one transverse annular sealing gasket ⁶² for engaging the male ⁷endpiece.

21 (amended). A pipe according to claim 20, wherein the inside of the ⁶skirt has at least one transverse annular sealing ⁶²gasket ⁷fixed thereto for engaging the male endpiece.

22 (amended). A pipe according to claim 1, wherein the ⁵ferrule has a transverse annular edge ²⁵longitudinally opposite from the transition between the ferrule and the skirt, and projecting transversely relative to said inside peripheral face in the immediate vicinity of said edge, at least one projecting catch engaged in a depression in the outside peripheral face to hold the ferrule longitudinally on the cylinder.

23 (amended). A pipe according to claim 22, wherein said depression is in the form of a transverse annular groove in said outside peripheral face.

24 (amended). A pipe according to claim 22, wherein the ferrule has a plurality of catches that are circumferentially localized, being regularly distributed circumferentially, all occupying the same longitudinal position and engaged in respective depressions or in said annular groove.

25 (amended). A pipe according to claim 1, wherein the ferrule is fastened to the cylinder by transverse pins that are regularly distributed circumferentially.

26 (amended). A female end ring for making a pipe according to claim 1, presenting a longitudinal axis and comprising:

- a longitudinal ferrule defined by a longitudinal inside peripheral face; and

- a longitudinal skirt situated axially in line with the ferrule,

the ferrule being elastically expandable circumferentially.

27 (amended). A female end ring according to claim 26, wherein said inside peripheral face presents at least one continuous annular portion in relief that is elastically

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and/or plastically compressible transversely and that is
integral with the ferrule.

28 (amended). A female end ring according to claim 26,
wherein said inside peripheral face flares in the
longitudinal direction going away from the transition
between the ferrule and the skirt.

29 (amended). A female end ring according to claim 27
wherein said continuous annular portion in relief is in
the form of a rib, and there is only one of them.

30 (amended). A female end ring according to claim 26,
further comprising abutment means on the inside at the
transition between the ferrule and the skirt, the abutment
means projecting transversely relative to said inside
peripheral face.

31 (amended). A female end ring according to claim 30,
wherein the skirt also presents a longitudinal inside
peripheral face and in that the abutment means also project
transversely relative thereto.

32 (amended). A female end ring according to claim 31,
wherein the abutment means comprise a circumferentially
continuous transverse annulus of uniform longitudinal
dimension.

33 (amended). A female end ring according to claim 26,
wherein the inside of the skirt is shaped suitably to

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receive and to hold at least one transverse annular sealing
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gasket.

34 (amended). A female end ring according to claim 33,
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wherein the inside of the skirt is integral with at least
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one transverse annular sealing gasket.

35 (amended). A female end ring according to claim 26,
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wherein the ferrule presents a transverse annular edge
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longitudinally opposite from the transition between the
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ferrule and the skirt, and projecting transversely relative
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to said inside peripheral face in the immediate vicinity of
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said edge at least one catch.

36 (amended). A female end ring according to claim 35,
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wherein the ferrule has a plurality of catches which are
circumferentially localized, which are regularly
distributed circumferentially, and all of which occupy the
same longitudinal position.

37 (amended). A female end ring according to claim 26,
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wherein the ferrule and the skirt present respective shapes
and transverse dimensions suitable for enabling a plurality
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of rings to be nested releasably and coaxially by nesting
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the ferrule of one with the skirt of another.

38 (amended). A method of manufacturing a pipe of the
type comprising:

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- a concrete cylinder possessing at least one annular
³ end of determined longitudinal axis, defined by a
⁹ longitudinal outside peripheral face and by a transverse
¹² front face;

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- a female end ring coaxial with said end and secured
thereto, the ring consisting in:

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- firstly a longitudinal ferrule for securing to the
² cylinder, the ferrule being defined by a longitudinal
²³ inside peripheral face fitting snugly against said outside
¹² peripheral face in the immediate vicinity of said front
¹¹ face; and

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- secondly a longitudinal skirt projecting
longitudinally over said front face to engage coaxially on
⁷ a male endpiece of another pipe,
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said method comprising an initial step of
prefabricating the ring,

a) prefabricating the cylinder independently of the
⁴ ring, the ring being dimensioned in such a manner that, at
²² a determined longitudinal distance from the transition
⁵ between the ferrule and the skirt, and in the absence of
⁴ the ring being expanded circumferentially, said inside
²³ peripheral face presents transverse dimensions that are
smaller than those presented by said outside peripheral
¹² face at the same longitudinal distance from said front

than that which corresponds to said state of circumferential elastic tension, until said relative position has been reached, and

in that the ferrule is allowed to leave said state of circumferential expansion so as to allow said transverse pressure to be established once said relative position has been reached.

42 (amended). A method according to claim 41, wherein the ferrule is placed in said state of circumferential expansion by means selected from the group comprising mechanical means and thermal means.

43 (amended). A method according to claim 38, wherein, respectively during the initial step and during step a), the ring and the cylinder are prefabricated in such a manner that said outside peripheral face and/or said inside peripheral face flare relative to their respective longitudinal axes in a longitudinal direction going away respectively from said front face and from the transition between the ferrule and the skirt.

44 (amended). A method according to claim 43, wherein during step a) the cylinder is prefabricated in such a manner that said outside peripheral face flares more than does said inside peripheral face relative to their respective longitudinal axes.

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45 (amended). A method according to claim 38, wherein between steps a) and b), a ring of adhesive⁵² is deposited on a localized zone of said outside peripheral face¹² and/or of said inside peripheral face²³ selected in such a manner that when implementing step b) and thereafter said zone constitutes a zone of mutual contact via said adhesive⁵² and of application of said transverse pressure.

46 (amended). A method according to claim 38, wherein between steps a) and b), at least one continuous ring of plastic sealing material is placed on said outside peripheral face¹² and/or said inside peripheral face²³, and in that during step b), said plastic sealing material between said inside peripheral face²³ and said outside peripheral face¹² is caused to be flattened and/or to creep.

47 (amended). A method according to claim 38, wherein between steps a) and b), a sealing gasket of elastically compressible material¹⁸ is put into place on said outside peripheral face¹² at least in the immediate vicinity of said front face¹¹,

and in that during step b), said gasket is put into elastic transverse compression stress between said inside peripheral face²³ and said outside peripheral face¹².

48 (amended). A method according to claim 47, wherein, during step a), the cylinder is prefabricated in such a

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manner that said outside peripheral face presents a localized annular setback¹⁷ at least in the immediate vicinity of said front face¹⁸, and in that between steps a) and b), said gasket is put into place by being received over a fraction of its transverse dimension in said setback¹⁷.

49 (amended). A method according to claim 47 wherein said gasket¹⁷ is selected in such a manner that it is in the form of a film.

50 (amended). A method according to claim 49, wherein said film is selected and placed in such a manner that it extends from said front face¹⁸ over a longitudinal dimension that is less than the longitudinal dimensions respectively of said outside peripheral face¹² and of said inside peripheral face²³.

51 (amended). A method according to claim 49, wherein between steps a) and b), after said film has been put into place, a ring of adhesive⁵³ is deposited on a localized zone¹⁸ of said film and/or of said inside peripheral face²³ selected in such a manner that during implementation of step b) and subsequently, said zone⁵³ constitutes a zone of mutual contact via said adhesive and of application of said transverse pressure.

52 (amended). A method according to claim 45, wherein
said adhesive is selected in such a manner that while in
the fresh state it constitutes a lubricant associating
implementation of step b) by progressive forced engagement
of the ferrule coaxially onto the annular end of the
cylinder, and subsequently serves to fasten them together.

53 (amended). A method according to claim 49, wherein
said film is selected and placed in such a manner as to
present at least one continuous annular bulge
longitudinally spaced apart from said front face by a
distance which is shorter than the respective longitudinal
dimensions of said outside peripheral face and said inside
peripheral face, so as to give rise to a longitudinally
localized increase in said tension and in said pressure.

54 (amended). A method according to claim 53 wherein
the hardness and the dimensions of said continuous annular
bulge are selected and step b) is implemented in such a
manner that in said determined relative position said
continuous annular bulge causes a corresponding continuous
annular groove to be formed in the inside peripheral face,
by localized plastic deformation of the ferrule.

55 (amended). A method according to claim 38, wherein
during step b) coaxial engagement of the ferrule on the
annular end of the cylinder is stopped when the

longitudinal abutment means come into abutment against said front face.

56 (amended). A method according to claim 55 wherein between steps a) and b), an annular transverse rim of said film is formed on said front face, and

in that during step b), said coaxial engagement is stopped when the longitudinal abutment means come into abutment against said front face via said rim.

57 (amended). A method according to claim 38 wherein in step a) or after step b), at least one transverse annular sealing gasket for engaging the male endpiece is secured to the inside of the skirt.

58 (amended). A method according to claim 38, wherein during step a), the cylinder is prefabricated in such a manner as to present in said outside peripheral face at a longitudinal distance from said front face corresponding to the longitudinal distance between said catch and the transition between the ferrule and the skirt, at least one depression for receiving said catch, there being at least one such catch, and in that step b) is implemented by progressively engaging the ferrule by force coaxially on the annular end of the cylinder and by pressing said at least one catch on said outside peripheral face by increasing elastic deformation of the ring and by allowing

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